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<120> PURINE METABOLISM GENES IN PLANTS

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<170> Microsoft Office 97

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<212> DNA
<213> Zea mays

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Ala Asp Lys Asp Cys Thr Glu Ser Ile Tyr Pro Val Ala Asp Ala Thr
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Thr Phe Phe Thr Asp Leu His Tyr Ile Leu Arg Val Thr Ala Ala Gly
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Ser Leu Phe Leu Asp Tyr His Arg Asn Pro Phe Pro Thr Phe Phe Gln
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<213> Oryza sativa

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<213> Oryza sativa

<400> 4

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Arg Asp Phe Tyr Asn Val Arg Lys Val Asp Thr His Val His His Ser
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Ala Cys Met Asn Gln Lys His Leu Leu Arg Phe Ile Lys Ser Lys Leu
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Arg Lys Glu Pro Asp Glu Val Val Ile Phe Arg Asp Gly Thr Tyr Leu
65                  70                  75                  80

Thr Leu Lys Glu Val Phe Glu Ser Leu Asp Leu Thr Gly Tyr Asp Leu
                85                  90                  95

Asn Val Asp Leu Leu Asp Val His Ala Asp Lys Ser Thr Phe His Arg
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Phe Asp Lys Phe Asn Leu Lys Tyr Asn Pro Cys Gly Gln Ser Arg Leu
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Ala Glu Leu Thr Lys Glu Val Phe Ser Asp Leu Glu Ala Ser Lys Tyr
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Gln Met Ala Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Lys Ser Glu
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Trp Asp Gln Met Ala Ser Trp Ile Val Asn Asn Glu Leu Tyr Ser Glu
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Asn Val Val Trp Leu Ile Gln Ile Pro Arg Ile Tyr Asn Val Tyr Arg
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Glu Met Gly Thr Ile Asn Ser Phe Gln Asn Leu Leu Asp Asn Ile Phe
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Leu Pro Leu Phe Glu Val Thr Val Asp Pro Ala Ser His Pro Gln Leu
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Ser Lys Pro Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro Glu Gln
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Trp Thr Asn Val Phe Asn Pro Ala Tyr Ala Tyr Tyr Val Tyr Tyr Cys
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Tyr Ala Asn Leu Tyr Thr Leu Asn Lys Leu Arg Glu Ser Lys Gly Met
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Thr Thr Ile Lys Leu Arg Pro His Cys Gly Glu Ala Gly Asp Ile Asp
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His Leu Ala Ala Ala Phe Leu Thr Ser His Asn Ile Ala His Gly Val
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Asn Leu Lys Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu Ala Gln
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Ile Gly Leu Ala Met Ser Pro Leu Ser Asn Asn Ser Met Phe Ile Asp
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Tyr His Arg Asn Pro Phe Pro Thr Phe Phe Leu Arg Gly Leu Asn Val
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Ser Leu Ser Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys Glu Pro
385                 390                 395                 400

Leu Val Glu Glu Tyr Ser Ile Ala Ala Ser Leu Trp Lys Leu Ser Ser
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Ser His Arg Leu Lys Ser His Trp Ile Gly Arg Asn Tyr Tyr Lys Arg
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Gly His Asp Gly Asn Asp Ile His Gln Thr Asn Val Pro His Ile Arg
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Lys Ser Ala Pro His Arg Asp Phe Tyr Asn Val Arg Lys Val Asp Thr
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His Val His His Ser Ala Cys Met Asn Gln Lys His Leu Leu Arg Phe
35 40 45

Ile Lys Ser Lys Leu Arg Lys Glu Pro Asp Glu Val Val Ile Phe Arg
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Asp Gly Thr Tyr Leu Thr Leu Glu Glu Val Phe Lys Ser Leu Asp Leu
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35 40 45

Arg Leu Tyr Asn Val Tyr Gln Xaa Lys Trp Gly Leu Leu His His Phe
50 55 60

Lys Asn Phe Leu Gly Gln His Phe Pro Pro Pro Val Trp Arg Leu Leu
65 70 75 80

Xaa Ser Ser Ser His Pro Ala Leu His Val Phe Pro Lys Ala Gly Leu
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Gly Leu Asp Leu Val Asp Asp Glu Xaa Asn Leu
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Ile Ala Leu Pro Asp
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Trp Glu Lys Glu Val Ile Asn Asp Pro Cys Thr Pro Lys Pro Asn Pro
35 40 45

Asn Pro Phe Thr Tyr Val Pro Glu Pro Lys Ser Glu His Val Phe Gln
50 55 60

Thr Val Asp Gly Val Ile His Val Tyr Ala Asp Lys Asp Cys Thr Glu
65 70 75 80

Ser Ile Tyr Pro Val Ala Asp Ala Thr Thr Phe Phe Thr Asp Leu His
85 90 95

Tyr Ile Leu Arg Val Thr Ala Ala Gly Asn Thr Arg Thr Val Cys His
100 105 110

Asn Arg Leu Asn Leu Leu Glu His Lys Phe Lys Phe His Leu Met Leu
115 120 125

Asn Ala Asp Arg Glu Phe Leu Ala Gln Lys Thr Ala Pro His Arg Asp
130 135 140

Phe Tyr Asn Val Arg Lys Val Asp Thr His Val His His Ser Ala Cys
145 150 155 160

Met Asn Gln Lys His Leu Leu Arg Phe Ile Lys Ser Lys Leu Arg Lys
165 170 175

Glu Pro Asp Glu Val Val Ile Phe Arg Asp Gly Thr Tyr Met Thr Leu
180 185 190

Lys Glu Val Phe Glu Ser Leu Asp Leu Thr Gly Tyr Asp Leu Asn Val
195 200 205

Asp Leu Leu Asp Val His Ala Asp Lys Ser Thr Phe His Arg Phe Asp
210 215 220

Lys Phe Asn Leu Lys Tyr Asn Pro Cys Gly Gln Ser Arg Leu Arg Glu
225 230 235 240

Ile Phe Leu Lys Gln Asp Asn Leu Ile Gln Gly Arg Phe Leu Ala Glu
245 250 255

Leu Thr Lys Gln Val Phe Ser Asp Leu Ser Ala Ser Lys Tyr Gln Met
260 265 270

Ala Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Gln Ser Glu Trp Asp
275 280 285

Gln Leu Ala Ser Trp Ile Val Asn Asn Glu Leu His Ser Gly Asn Val
290 295 300

Val Trp Leu Val Gln Ile Pro Arg Leu Tyr Asn Val Tyr Lys Glu Met
305 310 315 320

Gly Ile Val Thr Ser Phe Gln Asn Leu Leu Asp Asn Ile Phe Val Pro
325 330 335

Leu Phe Glu Val Thr Ile Asp Pro Ala Ser His Pro Gln Leu His Val
340 345 350

Phe Leu Lys Gln Val Val Gly Leu Asp Leu Val Asp Asp Glu Ser Lys
355 360 365

Pro Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro Glu Gln Trp Thr
370 375 380

Asn Val Phe Asn Pro Ala Phe Ser Tyr Tyr Ala Tyr Tyr Cys Tyr Ala
385 390 395 400

Asn Leu Phe Thr Leu Asn Lys Leu Arg Glu Ser Lys Gly Met Thr Thr
405 410 415

Ile Lys Phe Arg Pro His Ala Gly Glu Ala Gly Asp Val Asp His Leu
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Ala Ala Thr Phe Leu Leu Cys His Asn Ile Ser His Gly Ile Asn Leu
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Arg Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu Gly Gln Ile Gly
450 455 460

Leu Ala Met Ser Pro Leu Ser Asn Asn Ser Leu Phe Leu Asp Tyr His
465 470 475 480

Arg Asn Pro Phe Pro Thr Phe Phe Gln Arg Gly Leu Asn Val Ser Leu
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Ser Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys Glu Pro Leu Val
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Glu Glu Tyr Ser Ile Ala Ala Ser Leu Trp Lys Leu Ser Ser Cys Asp
515 520 525

Leu Cys Glu Ile Ala Arg Asn Ser Val Tyr Gln Ser Gly Phe Ser His
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Ala Leu Lys Ala His Trp Ile Gly Lys Asn Tyr Phe Lys Arg Gly Pro
545 550 555 560

Ala Gly Asn Asp Ile His Arg Thr Asn Val Pro His Ile Arg Val Gln
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35 40 45

Leu His Gly Ala Gln His Asn Pro Val Ala Ala Asp Ile Leu Arg Lys
50 55 60

Glu Pro Glu His Glu Thr Phe Ser Arg Ile Asn Ile Thr Ala Val Glu
65 70 75 80

Thr Pro Ser Pro Asp Glu Ile Glu Ala Tyr Lys Val Leu Gln Lys Cys
85 90 95

Leu Glu Leu Arg Glu Lys Tyr Met Phe Arg Glu Glu Val Ala Pro Trp
100 105 110

Glu Lys Glu Ile Ile Thr Asp Pro Ser Thr Pro Lys Pro Asn Pro Asn
115 120 125

Pro Phe Tyr Tyr Glu Gln Gln Thr Lys Thr Glu His His Phe Glu Met
130 135 140

Val Asp Gly Val Ile His Val Tyr Pro Asn Lys Asp Ala Lys Glu Arg
145 150 155 160

Ile Tyr Pro Val Ala Asp Ala Thr Thr Phe Phe Thr Asp Met His Tyr
165 170 175

Ile Leu Arg Val Leu Ala Ala Gly Asp Ile Arg Thr Val Cys Tyr Lys
180 185 190

Arg Leu Asn Leu Leu Glu Gln Lys Phe Asn Leu His Leu Met Val Asn
195 200 205

Ala Asp Arg Glu Leu Leu Ala Gln Lys Ala Ala Pro His Arg Asp Phe
210 215 220

Tyr Asn Val Arg Lys Val Asp Thr His Val His His Ser Ala Cys Met
225 230 235 240

Asn Gln Lys His Leu Leu Arg Phe Ile Lys Ser Lys Leu Arg Lys Glu
245 250 255

Pro Asp Glu Val Val Ile Phe Arg Asp Gly Thr Tyr Leu Thr Leu Lys
260 265 270

Glu Val Phe Glu Ser Leu Asp Leu Thr Gly Tyr Asp Leu Asn Val Asp
275 280 285

Leu Leu Asp Val His Ala Asp Lys Ser Thr Phe His Arg Phe Asp Lys
290 295 300

Phe Asn Leu Lys Tyr Asn Pro Cys Gly Gln Ser Arg Leu Arg Glu Ile
305 310 315 320

Phe Leu Lys Gln Asp Asn Leu Ile Gln Gly Arg Phe Leu Ala Glu Leu
325 330 335

Thr Lys Glu Val Phe Ser Asp Leu Glu Ala Ser Lys Tyr Gln Met Ala
340 345 350

Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Lys Ser Glu Trp Asp Gln
355 360 365

Met Ala Ser Trp Ile Val Asn Asn Glu Leu Tyr Ser Glu Asn Val Val
370 375 380

Trp Leu Ile Gln Ile Pro Arg Ile Tyr Asn Val Tyr Arg Glu Met Gly
385 390 395 400

Thr Ile Asn Ser Phe Gln Asn Leu Leu Asp Asn Ile Phe Leu Pro Leu
405 410 415

Phe Glu Val Thr Val Asp Pro Ala Ser His Pro Gln Leu His Val Phe
420 425 430

Leu Gln Gln Val Val Gly Leu Asp Leu Val Asp Asp Glu Ser Lys Pro
435 440 445

Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro Glu Gln Trp Thr Asn
450 455 460

Val Phe Asn Pro Ala Tyr Ala Tyr Tyr Val Tyr Tyr Cys Tyr Ala Asn
465 470 475 480

Leu Tyr Thr Leu Asn Lys Leu Arg Glu Ser Lys Gly Met Thr Thr Ile
485 490 495

Lys Leu Arg Pro His Cys Gly Glu Ala Gly Asp Ile Asp His Leu Ala
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Ala Ala Phe Leu Thr Ser His Asn Ile Ala His Gly Val Asn Leu Lys
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Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu Ala Gln Ile Gly Leu
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Ala Met Ser Pro Leu Ser Asn Asn Ser Leu Phe Ile Asp Tyr His Arg
545 550 555 560

Asn Pro Phe Pro Thr Phe Phe Leu Arg Gly Leu Asn Val Ser Leu Ser
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Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys Glu Pro Leu Val Glu
580 585 590

Glu Tyr Ser Ile Ala Ala Ser Leu Trp Lys Leu Ser Ser Cys Asp Leu
595 600 605

Cys Glu Ile Ala Arg Asn Ser Val Tyr Gln Ser Gly Phe Ser His Arg
610 615 620

Leu Lys Ser His Trp Ile Gly Arg Asn Tyr Tyr Lys Arg Gly His Asp
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Gly Asn Asp Ile His Gln Thr Asn Val Pro His Ile Arg Ile Glu Phe
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Gln Met Ala Ile Thr Pro Ser Met Ile Arg Ser His Ser Val Ser Gly
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Asp Leu His Gly Val Gln Pro Asp Pro Ile Ala Ala Asp Ile Leu Arg
50 55 60

Lys Glu Pro Glu His Glu Thr Phe Thr Arg Leu Arg Ile Thr Pro Leu
65 70 75 80

Glu Ala Pro Ser Pro Asp Glu Ile Glu Ala Tyr Val Val Leu Gln Glu
85 90 95

Cys Leu Glu Met Arg Lys Arg Tyr Val Phe Arg Glu Ala Val Ala Pro
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Trp Asp Lys Glu Val Ile Ser Asp Pro Ser Thr Pro Lys Pro Asn Pro
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Asp Pro Phe Leu Tyr Ile Pro Glu Gly Asn Ser Asp His Tyr Phe Glu
130 135 140

Met Gln Asp Gly Val Ile Arg Val Tyr Pro Asp Arg Asp Ala Lys Glu
145 150 155 160

Glu Leu Phe Pro Val Ala Asp Ala Thr Thr Phe Phe Thr Asp Leu His
165 170 175

His Leu Leu Arg Val Ile Ala Ala Gly Asn Ile Arg Thr Leu Cys His
180 185 190

His Arg Leu Asn Leu Leu Glu Gln Lys Phe Asn Leu His Leu Met Leu
195 200 205

Asn Ala Asp Arg Glu Phe Leu Ala Gln Lys Ser Ala Pro His Arg Asp
210 215 220

Phe Tyr Asn Val Arg Lys Val Asp Thr His Val His His Ser Ala Cys
225 230 235 240

Met Asn Gln Lys His Leu Leu Arg Phe Ile Lys Ser Lys Leu Arg Lys
245 250 255

Glu Pro Asp Glu Val Val Ile Phe Arg Asp Gly Thr Tyr Leu Thr Leu
260 265 270

Glu Glu Val Phe Lys Ser Leu Asp Leu Ser Gly Tyr Asp Leu Asn Val
275 280 285

Asp Leu Leu Asp Val His Ala Asp Lys Ser Thr Phe His Arg Phe Asp
290 295 300

Lys Phe Asn Leu Lys Tyr Asn Pro Cys Gly Gln Ser Arg Leu Arg Glu
305 310 315 320

Ile Phe Leu Lys Gln Asp Asn Leu Ile Gln Gly Arg Phe Leu Gly Glu
325 330 335

Leu Thr Lys Gln Val Phe Ser Asp Leu Ala Ala Ser Lys Tyr Gln Met
340 345 350

Ala Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Gln Ser Glu Trp Asp
355 360 365

Gln Leu Ala Ser Trp Ile Val Asn Asn Asp Leu Tyr Ser Glu Asn Val
370 375 380

Val Trp Leu Ile Gln Leu Pro Arg Leu Tyr Asn Val Tyr Lys Glu Met
385 390 395 400

Gly Ile Val Thr Ser Phe Gln Asn Met Leu Asp Asn Ile Phe Ile Pro
405 410 415

Leu Phe Glu Val Thr Val Asn Pro Asp Ser His Pro Gln Leu His Val
420 425 430

Phe Leu Lys Gln Val Val Gly Leu Asp Leu Val Asp Asp Glu Ser Lys
435 440 445

Pro Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro Glu Gln Trp Thr
450 455 460

Asn Val Phe Asn Pro Ala Phe Ser Tyr Tyr Val Tyr Tyr Cys Tyr Ala
465 470 475 480

Asn Leu Tyr Thr Leu Asn Lys Leu Arg Glu Ser Lys Gly Met Thr Thr
485 490 495

Ile Lys Phe Arg Pro His Ser Gly Glu Ala Gly Asp Ile Asp His Leu
500 505 510

Ala Ala Thr Phe Leu Thr Ala His Asn Ile Ala His Gly Ile Asn Leu
515 520 525

Lys Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu Ala Gln Ile Gly
530 535 540

Leu Ala Met Ser Pro Leu Ser Asn Asn Ser Leu Phe Leu Asp Tyr His
545 550 555 560

Arg Asn Pro Phe Pro Met Phe Phe Leu Arg Gly Leu Asn Val Ser Leu
565 570 575

Ser Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys Glu Pro Leu Val
580 585 590

Glu Glu Tyr
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<210> 19
<211> 1988
<212> DNA
<213> Triticum aestivum

<400> 19
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ttctccgggt gactgccgcg gggaacacaa gaactgtctg ccataaccga ttgaatcttc 240
tagaacataa gttcaaattt catctgatgt taaacgcgga cagggagttt cttgcccaaa 300

aaactgcacc acatcgtgat ttttacaatg ttaggaaggt cgacactcat gttcaccact 360
cagcatgcat gaatcagaaa catttgctga gattcatcaa gtccaaactg agaaaagaac 420
ctgatgaggt tgtcattttc agagatggta catatatgac tttgaaggag gtttttgaga 480
gcttggactt aactgggtat gacttgaatg ttgatttgct agatgtccat gcggacaaaa 540
gtacgtttca tcgttttgac aaattcaacc ttaaatacaa tccatgtgga caaagtaggc 600
tacgggagat tttccttaaa caggacaatc ttattcaagg acgatttctt gctgagctga 660
cgatgcaagt tttttctgac cttaatgcaa gcaagtatca gatggctgaa tataggattt 720
caatctatgg gaggaagcaa agtgagtggg accaacttgc gagttggata gtaaacaatg 780
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cagggaggca agtgctcggt gtgaaactgt cgccctttc gcctgtaaag gattgtaatt 1920
aacaaaggat gctgtgactg ttataacaat atattgctaa taaagtgatg ccgcactgtt 1980
tcgctctg 1988

<210> 20
<211> 345
<212> PRT
<213> Triticum aestivum

<400> 20
Arg Cys Lys Phe Phe Ser Asp Leu Asn Ala Ser Lys Tyr Gln Met Ala
1 5 10 15

Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Gln Ser Glu Trp Asp Gln
20 25 30

Leu Ala Ser Trp Ile Val Asn Asn Glu Leu Tyr Ser Glu Asn Val Val
35 40 45

Trp Leu Ile Gln Ile Pro Arg Leu Tyr Asn Val Tyr Gln Gln Met Gly
50 55 60

Ile Val Thr Ser Phe Gln Asn Leu Leu Asp Asn Ile Phe Leu Pro Leu
65 70 75 80

Phe Glu Val Thr Ile Asp Pro Ala Ser His Pro Gln Leu His Val Phe
85 90 95

Leu Lys Gln Val Val Gly Leu Asp Leu Val Asp Asp Glu Ser Lys Pro
100 105 110

Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro Glu Glu Trp Thr Asn
115 120 125

Val Phe Asn Pro Ala Phe Ser Tyr Tyr Ala Tyr Tyr Cys Tyr Ala Asn
130 135 140

Leu Tyr Thr Leu Asn Lys Leu Arg Glu Ser Lys Gly Met Asn Thr Ile
145 150 155 160

Lys Phe Arg Pro His Ala Gly Glu Ala Gly Asp Val Asp His Leu Ala
165 170 175

Ala Thr Phe Leu Leu Cys His Ser Ile Ser His Gly Ile Asn Leu Arg
180 185 190

Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu Gly Gln Ile Gly Leu
195 200 205

Ala Met Ser Pro Leu Ser Asn Asn Ser Leu Phe Leu Asp Tyr His Arg
210 215 220

Asn Pro Phe Pro Met Phe Phe Gln Arg Gly Leu Asn Val Ser Leu Ser
225 230 235 240

Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys Glu Pro Leu Val Glu
245 250 255

Glu Tyr Ser Ile Ala Ala Ser Leu Trp Lys Leu Ser Ser Cys Asp Leu
260 265 270

Cys Glu Ile Ala Arg Asn Ser Val Tyr Gln Ser Gly Phe Ser His Ala
275 280 285

Leu Lys Ala His Trp Ile Gly Lys Asn Tyr Tyr Lys Arg Gly Pro Ser
290 295 300

Gly Asn Asp Ile His Arg Thr Asn Val Pro Thr Ile Arg Ile Glu Phe
305 310 315 320

Arg Asp Leu Ile Trp Arg Asp Glu Met Gln Leu Val Tyr Leu Asn Asn
325 330 335

Val Ile Leu Pro Asp Glu Val Asp Gln
340 345

<210> 21
<211> 1447
<212> DNA
<213> Glycine max

<400> 21
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gtatttcttc aagattacaa acagattatt gcagctcgaa cagggccaat cgaagcatac 120
ggagtaatac atttactttg caatctcgag tccttcacac aaaatctttt caatacaata 180
aatcaaaatg tgtggtgaaa atatgaagca gttcctcaag gagctcccaa aatgtgagca 240
tcacattcat atcgaggggt ctctgtctcc agctctgctg ttcgaattgg caaagacaaa 300
caacatcgcc cttcccgact ctgcggctga tgcctctttc aaatctcccc aagaactcga 360
gtctcgctac gaacggttta cttctctcaa cgatttcctc cattactatt acattggcat 420
gtcagtgtta ataaaccctg ccgactatga aagcttggcc tatgaatatc tcacaaaagc 480
aaatcgcgac ggtgttcacc atgctgaaat tttcttcgat ccacaagcac acactgaacg 540
tggaattgca tacaacactg ttgttgaggg tctttcggct ggactaaagc gcgctgagaa 600

ggattttggt atcacctcaa aactcattct atgctttttg cgacacttgt cggctgagga 660
tgcaaaaact acatatcagg aagcggtttc gttgggtcac ttttcaaacg ggactgtagc 720
tgctattggc cttgatagca gtgaggtcgg tttcccacca gaaattttca gagagattta 780
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gttggctgaa gatgaaaatt tgttaaagcg agtagcggag caggggacaa tgttgacagt 960
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aaagttcttg gatggaggaa ttaaattcag catcaacagc gacgatccag cttactttgg 1080
tggttacatt ttggataatt atcttgccgt tcaagaagca tttggcttaa atttaaagga 1140
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ggtgttgttg agcaaggttg acgcttgcgc caaaaagtac gaggcattgc tttgaaagga 1260
ggagtaaaca aaagttaaac actgcggcat tttcgagttt ggatttgatc tgagatttgc 1320
agatatgcag atagactggt ggtgaagaca atatacatct agattggttc acttcagcct 1380
ttaataattg gcgctggact caagaacaat atctaaatga cacagaaaaa aaaaaaaaaa 1440
aaaaaaa 1447

<210> 22
<211> 355
<212> PRT
<213> Glycine max

<400> 22
Met Cys Gly Glu Asn Met Lys Gln Phe Leu Lys Glu Leu Pro Lys Cys
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Glu His His Ile His Ile Glu Gly Ser Leu Ser Pro Ala Leu Leu Phe
20 25 30

Glu Leu Ala Lys Thr Asn Asn Ile Ala Leu Pro Asp Ser Ala Ala Asp
35 40 45

Ala Ser Phe Lys Ser Pro Gln Glu Leu Glu Ser Arg Tyr Glu Arg Phe
50 55 60

Thr Ser Leu Asn Asp Phe Leu His Tyr Tyr Tyr Ile Gly Met Ser Val
65 70 75 80

Leu Ile Asn Pro Ala Asp Tyr Glu Ser Leu Ala Tyr Glu Tyr Leu Thr
85 90 95

Lys Ala Asn Arg Asp Gly Val His His Ala Glu Ile Phe Phe Asp Pro
100 105 110

Gln Ala His Thr Glu Arg Gly Ile Ala Tyr Asn Thr Val Val Glu Gly
115 120 125

Leu Ser Ala Gly Leu Lys Arg Ala Glu Lys Asp Phe Gly Ile Thr Ser
130 135 140

Lys Leu Ile Leu Cys Phe Leu Arg His Leu Ser Ala Glu Asp Ala Lys
145 150 155 160

Thr Thr Tyr Gln Glu Ala Val Ser Leu Gly His Phe Ser Asn Gly Thr
165 170 175

Val Ala Ala Ile Gly Leu Asp Ser Ser Glu Val Gly Phe Pro Pro Glu
180 185 190

Ile Phe Arg Glu Ile Tyr Glu Ser Ala Glu Thr Lys Gly Ile His Arg
195 200 205

Thr Ala His Ala Gly Glu Glu Gly Asp Thr Ser Tyr Ile Ser Arg Ala
210 215 220

Leu Asp Ile Cys Lys Val Glu Arg Ile Asp His Gly Ile Arg Leu Ala
225 230 235 240

Glu Asp Glu Asn Leu Leu Lys Arg Val Ala Glu Gln Gly Thr Met Leu
245 250 255

Thr Val Cys Pro Leu Ser Asn Val Arg Leu Arg Cys Val Glu Asn Val
260 265 270

Gly Gln Leu Pro Ile Arg Lys Phe Leu Asp Gly Gly Ile Lys Phe Ser
275 280 285

Ile Asn Ser Asp Asp Pro Ala Tyr Phe Gly Gly Tyr Ile Leu Asp Asn
290 295 300

Tyr Leu Ala Val Gln Glu Ala Phe Gly Leu Asn Leu Lys Glu Trp Lys
305 310 315 320

Tyr Ile Ala Thr Ser Ala Ile Glu Gly Ser Trp Cys Asp Asp Glu Arg
325 330 335

Lys Ala Val Leu Leu Ser Lys Val Asp Ala Cys Ala Lys Lys Tyr Glu
340 345 350

Ala Leu Leu
355

<210> 23
<211> 600
<212> PRT
<213> [Arabidopsis thaliana]

<400> 23
Met Ile Cys Leu Glu Val Pro Thr Ser Asp Glu Val Glu Ala Tyr Lys
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Cys Leu Gln Glu Cys Leu Glu Leu Arg Lys Arg Tyr Val Phe Gln Glu
20 25 30

Thr Val Ala Pro Trp Glu Lys Glu Val Ile Ser Asp Pro Ser Thr Pro
35 40 45

Lys Pro Asn Thr Glu Pro Phe Ala His Tyr Pro Gln Gly Lys Ser Asp
50 55 60

His Cys Phe Glu Met Gln Asp Gly Val Val His Val Phe Ala Asn Lys
65 70 75 80

Asp Ala Lys Glu Asp Leu Phe Pro Val Ala Asp Ala Thr Ala Phe Phe
85 90 95

Thr Asp Leu His His Val Leu Lys Val Ile Ala Ala Gly Asn Ile Arg
100 105 110

Thr Leu Cys His Arg Arg Leu Val Leu Leu Glu Gln Lys Phe Asn Leu
115 120 125

His Leu Met Leu Asn Ala Asp Lys Glu Phe Leu Ala Gln Lys Ser Ala
130 135 140

Pro His Arg Asp Phe Tyr Asn Val Arg Lys Val Asp Thr His Val His
145 150 155 160

His Ser Ala Cys Met Asn Gln Lys His Leu Leu Arg Phe Ile Lys Ser
165 170 175

Lys Leu Arg Lys Glu Pro Asp Glu Val Val Ile Phe Arg Asp Gly Thr
180 185 190

Tyr Leu Thr Leu Arg Glu Val Phe Glu Ser Leu Asp Leu Thr Gly Tyr
195 200 205

Asp Leu Asn Val Asp Leu Leu Asp Val His Ala Asp Lys Ser Thr Phe
210 215 220

His Arg Phe Asp Lys Phe Asn Leu Lys Tyr Asn Pro Cys Gly Gln Ser
225 230 235 240

Arg Leu Arg Glu Ile Phe Leu Lys Gln Asp Asn Leu Ile Gln Gly Arg
245 250 255

Phe Leu Gly Glu Ile Thr Lys Gln Val Phe Ser Asp Leu Glu Ala Ser
260 265 270

Lys Tyr Gln Met Ala Glu Tyr Arg Ile Ser Ile Tyr Gly Arg Lys Met
275 280 285

Ser Glu Trp Asp Gln Leu Ala Ser Trp Ile Val Asn Asn Asp Leu Tyr
290 295 300

Ser Glu Asn Val Val Trp Leu Ile Gln Leu Pro Arg Leu Tyr Asn Ile
305 310 315 320

Tyr Lys Asp Met Gly Ile Val Thr Ser Phe Gln Asn Ile Leu Asp Asn
325 330 335

Ile Phe Ile Pro Leu Phe Glu Ala Thr Val Asp Pro Asp Ser His Pro
340 345 350

Gln Leu His Val Phe Leu Lys Gln Val Val Gly Phe Asp Leu Val Asp
355 360 365

Asp Glu Ser Lys Pro Glu Arg Arg Pro Thr Lys His Met Pro Thr Pro
370 375 380

Ala Gln Trp Thr Asn Ala Phe Asn Pro Ala Phe Ser Tyr Tyr Val Tyr
385 390 395 400

Tyr Cys Tyr Ala Asn Leu Tyr Val Leu Asn Lys Leu Arg Glu Ser Lys
405 410 415

Gly Met Thr Thr Ile Thr Leu Arg Pro His Ser Gly Glu Ala Gly Asp
420 425 430

Ile Asp His Leu Ala Ala Thr Phe Leu Thr Cys His Ser Ile Ala His
435 440 445

Gly Ile Asn Leu Arg Lys Ser Pro Val Leu Gln Tyr Leu Tyr Tyr Leu
450 455 460

Ala Gln Ile Gly Leu Ala Met Ser Pro Leu Ser Asn Asn Ser Leu Phe
465 470 475 480

Leu Asp Tyr His Arg Asn Pro Phe Pro Val Phe Phe Leu Arg Gly Leu
485 490 495

Asn Val Ser Leu Ser Thr Asp Asp Pro Leu Gln Ile His Leu Thr Lys
500 505 510

Glu Pro Leu Val Glu Glu Tyr Ser Ile Ala Ala Ser Val Trp Lys Leu
515 520 525

Ser Ala Cys Asp Leu Cys Glu Ile Ala Arg Asn Ser Val Tyr Gln Ser
530 535 540

Gly Phe Ser His Ala Leu Lys Ser His Trp Ile Gly Lys Asp Tyr Tyr
545 550 555 560

Lys Arg Gly Pro Asp Gly Asn Asp Ile His Lys Thr Asn Val Pro His
565 570 575

Ile Arg Val Glu Phe Arg Asp Thr Val Trp Asn Glu Ile Tyr Leu Phe
580 585 590

Phe Thr Gln Val Asn Phe Ser Leu
595 600

<210> 24
<211> 333
<212> PRT
<213> [Escherichia coli]

<400> 24
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1 5 10 15

Gly Asn Ile Arg Pro Gln Thr Ile Leu Glu Leu Gly Arg Gln Tyr Asn
20 25 30

Ile Ser Leu Pro Ala Gln Ser Leu Glu Thr Leu Ile Pro His Val Gln
35 40 45

Val Ile Ala Asn Glu Pro Asp Leu Val Ser Phe Leu Thr Lys Leu Asp
50 55 60

Trp Gly Val Lys Val Leu Ala Ser Leu Asp Ala Cys Arg Arg Val Ala
65 70 75 80

Phe Glu Asn Ile Glu Asp Ala Ala Arg His Gly Leu His Tyr Val Glu
85 90 95

Leu Arg Phe Ser Pro Gly Tyr Met Ala Met Ala His Gln Leu Pro Val
100 105 110

Ala Gly Val Val Glu Ala Val Ile Asp Gly Val Arg Glu Gly Cys Arg
115 120 125

Thr Phe Gly Val Gln Ala Lys Leu Ile Gly Ile Met Ser Arg Thr Phe
130 135 140

Gly Glu Ala Ala Cys Gln Gln Glu Leu Glu Ala Phe Leu Ala His Arg
145 150 155 160

Asp Gln Ile Thr Ala Leu Asp Leu Ala Gly Asp Glu Leu Gly Phe Pro
165 170 175

Gly Ser Leu Phe Leu Ser His Phe Asn Arg Ala Arg Asp Ala Gly Trp
180 185 190

His Ile Thr Val His Ala Gly Glu Ala Ala Gly Pro Glu Ser Ile Trp
195 200 205

Gln Ala Ile Arg Glu Leu Gly Ala Glu Arg Ile Gly His Gly Val Lys
210 215 220

Ala Ile Glu Asp Arg Ala Leu Met Asp Phe Leu Ala Glu Gln Gln Ile
225 230 235 240

Gly Ile Glu Ser Cys Leu Thr Ser Asn Ile Gln Thr Ser Thr Val Ala
245 250 255

Glu Leu Ala Ala His Pro Leu Lys Thr Phe Leu Glu His Gly Ile Arg
260 265 270

Ala Ser Ile Asn Thr Asp Asp Pro Gly Val Gln Gly Val Asp Ile Ile
275 280 285

His Glu Tyr Thr Val Ala Ala Pro Ala Ala Gly Leu Ser Arg Glu Gln
290 295 300

Ile Arg Gln Ala Gln Ile Asn Gly Leu Glu Met Ala Phe Leu Ser Ala
305 310 315 320

Glu Glu Lys Arg Ala Leu Arg Glu Lys Val Ala Ala Lys
325 330